THE IMPORTANCE OF ASSET ALLOCATION AND ACTIVE MANAGEMENT FOR CANADIAN MUTUAL FUNDS

by

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Abstract

Several different factors, including asset allocation policy, active portfolio management and market movements affect the return of a mutual fund. Existing studies test the relative importance of asset allocation policy and active management in explaining the variability of performance. In this paper, we use data for the period 2000-2010 to test the factors' role in determining performance of Canadian equity funds, balanced funds and international funds. The results show that asset allocation policy has the same level of explanatory power as that of active management, with slightly difference among funds of different investment styles.

Key words: Canadian mutual funds, Active management return, Investment policy return

Dedication

I wish to dedicate this paper to my dearest parents and grandparents for their endless support. Also I wish to dedicate this paper to all my friends, who care and support me during the period I study in Canada.

Yuefeng Zhao

I wish to dedicate this paper to my dearest parents for their love. I also want to dedicate this paper to my teacher and classmates, who always support me during my study in SFU.

Fan Zhang

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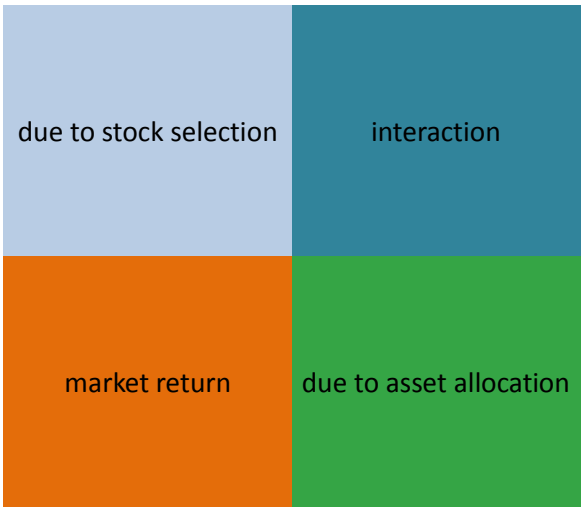
1. Introduction

Generally, a fund's total return could be divided into 3 components: the market return, the asset allocation policy return adjusted after market return and active portfolio management return. Total return of a fund is the return net of all expenses and fees. Asset allocation is the decision of how a fund should be invested across each of several asset classes, representing impact of investment decisions. Market return is a benchmark for portfolio or fund's performance based on market movement, representing passive participation in the markets. Active portfolio management return is the remaining returns after excluding the attribution due to asset allocation policy return and market return.

Figure1. Decomposition of total return



(Market return + Asset allocation = Policy return, Stock selection + Interaction = Policy return)

Past empirical studies have shown two opinions concerning the role of these 3 components in determining the fund's performance; some argue that asset allocation policy has a dominant explanatory power for total return variations; on the contrary, some believe that this high explanatory power is dominated by market return.

In this paper, we use the 10-year data of monthly return for Canadian equity funds, Canadian

balanced funds and Canadian international funds to test the importance of these 3 components of funds' performance. Moreover, to simplify the analysis, we use the factor model to calculate each fund's asset allocation policy return. Our measure of market return is market-capitalization-weighted average return of selected indices which could reflect total market movement for each period.

Both time-series and period-by-period cross-sectional regressions have been used in our test. Furthermore, to remove the impact of applicable market returns, we use adjusted returns over market movement as dependent and independent variables.

This paper has four sections. The first section, introduction, is a brief literature review of previous research on the importance of asset allocation and active management, followed by a summary of the difference between our study and previous ones. The second section describes the data and the empirical framework. The results are shown in the third section. Section 4 is our conclusion, together with detailed analysis and some limitations of our study

1.1 Literature Review

The asset class factor model was adopted by Sharpe (1992) to evaluate the factors that total returns of different funds were exposed to. In his model, $R_i = \sum_{t=1}^{n} b_{it} F_t + e_i$, where R_i is the total return on asset i, F_t is the value of factor t, b_{it} represents the sensitivity of R_i to factor t, and e_i measures the return due to selection. The limitation of this model is that if most of the investment managers have diversified across the factors, the inclusion of these factors would have little explanatory power in this model. Based on 60-month data from January 1985 to December 1989, Sharpe concluded that funds' style attributed more than 85% to total returns.

Many researchers have attempted to estimate the relative explanatory power of market return and asset allocation policy return in total return. One of the most often cited is the study by Brinson, Hood, and Beebower (1986). In that article, they documented the overwhelming

contribution of asset allocation policy return to the total return of a sample of 91 large U.S corporate pension funds in the SEI Large Plan Universe for a complete 10-year (40-quarter) period beginning in 1974. For convenience, they assumed that the 10-year average holding of every asset class could approximately represent the normal holding. For common stock, cash and bonds, the market benchmarks were S&P 500, 30-day Treasury Bills and Shearson Lehman Government/Corporate Bond Index (SLGC). Brinson, Hood, and Beebower (1986) found that investment policy return explained the larger portion (more than 90%) of total returns for selected pension funds. Several years later, Brinson, Singer and Beehower (1991) used data from 82 large pension funds from December 1977 to December 1987 to update Brinson, Hood, and Beebower (1986) result while using the same systematic framework. The article confirmed the previous study. The updated data indicated that about 91.5% of variation in total returns could be explained by investment policy. The limitation of the two articles is that they used only time-series regression and did not remove market return from total returns and policy returns.

Later studies revealed opposite results. Hensel, Ezra and Ilkiw (1991) examined the volatility of returns for seven Russell U.S sponsors, using data from 1985 to 1988. They found that over the selected four-year period, about 97% of the variation of the total returns could be explained by "naïve allocation", which could be interpreted as market movements. The data also indicated that market timing, security selection and the impact of interactions and activity, on average, reduced the returns. Asset allocation policy may have impact on total return, but it was not as large as that of market movements.

Ibbotson and Kaplan (2000) also disagreed with the conclusion by Brinson, Hood, and Beebower (1986). They used 10 years data of monthly returns for 94 U.S balanced funds and 5 years data of monthly returns for 58 pension funds and the policy weights were calculated by return-based style analysis over the selected period. They summarized that asset allocation policy could explain about 90% of the variation of a fund's total return(time series) but only explained about 40% of variations of the total returns of different funds(cross sectional), contrary to about 90% in Brinson, Hood, and Beebower (1986).

Among the studies on the correlation between total market returns and portfolio returns (i.e. correlation between stock markets returns and equity funds returns, correlation between

global equity markets returns and national equity market returns), Bruno Solnik and Jacques Roulet (2000) suggested using cross-section method to estimate the correlation level of national equity markets with global equity markets. The correlation in this paper is measured by standard deviation of the world market divided by dispersion of the national market. There are some advantages in using dispersion based on cross-section methods, but the requirement of a relatively large number of markets makes this method inappropriate in our factor model. This paper also pointed out that there might be different conclusions through cross-section method and through time-series method because of the different condition constrains.

Harindra de Silva, Steven Sapra, and Steven Thorley (2001) pointed out the important impact the market return had on funds returns. Their paper all deal with securities but use different empirical methods, thus CAPM is used in measuring fund return dispersion. The dispersion of market return in this paper is measured in a similar way as that in Bruno Solnik and Jacques Roulet (2000). By putting these two dispersions together, the authors made a conclusion that the market return had an important impact on funds' performances. And consequently less important role active management played. This paper also introduces a performance valuation method by making adjustment to get "dispersion-corrected" alpha. Here the alpha refers to the funds' adjusted return over benchmark less a random tracking error. However, CAPM is inapplicable in measuring funds' return because of the lack of details of asset allocation in the funds.

1.2 Purpose

There are already many articles on the importance of asset allocation in funds' performance measurement, but most of the articles used U.S data. In this paper, we analyze the importance of asset allocation for the performance of Canadian funds, compared to other factors. We contribute to the literature by presenting more results for Canadian mutual fund industry. Our findings show that investment policy return can explain very large percent of total return for all the three style funds.

2. Data and Methodology

2.1 Data Selection

There are about two thousand Canadian mutual funds existing. If we classify them by regions, there are U.S equity funds, Japanese equity funds and Greater China equity funds etc. If we classify them by segments, there are high yield fixed income funds, income trust equity funds and money market funds etc.

In this study, we classify all the funds into three categories: equity, balanced and international. In order to estimate and test our empirical model, we use funds' returns data from Morningstar and index data from Bloomberg. All the total returns are adjusted after management expenses. To analyze the asset allocation effects, 10 years of data, starting from May, 2000 to April, 2010, is extracted from Morningstar Canada mutual fund database. There are 293 Canadian equity funds, 442 balanced funds and 230 international funds in the database. We removed funds which have return history less than 10 years. The final sample consisted of 73 Canadian equity funds, 63 Canadian balanced funds and 73 Canadian international funds. The selected funds represent all of the Canada mutual funds in the Morningstar universe over the past 10-year period.

Survival bias should be notified here since all the funds whose data are visible on Morningstar and Bloomberg are "successful funds", while failures are ignored. Thus, overly optimistic returns or market capitalizations might be observed. However, in this paper what we consider is the correlation between asset allocation and returns, and funds survival because of their excellent asset allocation policy decision. In both successful funds and failure funds, what percentage asset allocation policy and active management can explain of the returns will not be quite different. So the survival bias does not have significant impact on our results. Exactly speaking, we are trying to find relationship between asset allocation and returns of successful funds in this paper.

For Canadian equity funds, portfolio segments consisted of common stocks listed on Toronto Stock Exchange (TSX) only. For Canadian balanced funds, portfolio segments consisted of

common stocks listed on Toronto Stock Exchange (TSX), marketable bonds (both corporate and government obligations, regardless of time to maturity) on Canadian market and cash equivalents (i.e. 30-day and 91-day Treasury-bills issued by Canada government). For Canadian international funds, portfolio segments consisted of common stocks listed on the major stock exchange all over the world and cash holdings. Because normal weights for each asset class for most selected funds are not available, we instead construct factor model to estimate each fund's asset allocation policy return. The details are discussed in the following part.

The benchmarks (market return) for each fund class are chosen according to their portfolio segments. Indices data are extracted from Bloomberg database. We use continuously compounded return to calculate index's monthly return.

For the Canadian equity funds, we choose the monthly return of S&P/Toronto Stock Exchange 60 (SPTSX 60), S&P/Toronto Stock Exchange Completion Index (SPTSXM) and S&P/Toronto Stock Exchange S&P/Toronto Stock Exchange Small-cap Index (SPTSXS) as benchmarks. SPTSX60 consists of 60 of the largest and most liquid stocks on TSX. Most of them are domestic and multinational industry leaders. SPTSXM and SPTSXS are representative of mid-cap and small-cap stocks on TSX. All of the three indices are capitalization-weighted and could represent the overall movements of common stocks on TSX. Besides all the three indices returns above, the monthly return of Bloomberg/EFFAS Bond Indices Canada Government with maturity of 1-3 years, 3-7 years, 7-10 years and 10 years and more and Morgan Stanley Capital International (MSCI) Emerging Markets index are chosen for Canadian balanced funds. We used total return of 91-day Treasury-bills of Canada Government for cash equivalents. Similar to Xiong, Ibbotson, Idzorek, and Chen (2010), for the Canadian international funds, we have chosen seven indices: S&P 500 index, MSCI Japan index, MSCI Canada index, MSCI Asia index (excluding Japan), MSCI UK index, MSCI Europe index (excluding UK) and MSCI Emerging Markets index. These seven indices could explain most of the movements of global stock markets.

2.2 Methodology

We chose three Canadian portfolio peer groups: International funds, Canadian equity funds and balanced funds. For each of these three groups, we take the following steps to analyze them.

2.2.1 Calculation of Policy Return

There are two alternative methods to determine the policy return of a fund.

The first way is to use the actual asset allocation of the fund at each period (it is monthly data over a ten-year in this paper). Then calculate the weighted average return in each month by multiplying the returns of each market in this month with the proportion of the investment the fund invested in this market in the same month.

$$P_{i,t} = \sum_{N=1}^{n} W_{iN,t} \times M_{N,t} + e_{i,t} \qquad (1)$$

Where $P_{i,t}$ is the policy return of fund i at time t, $W_{iN,t}$ is the proportion of investment fund i invested in market N at time t, $M_{N,t}$ is the return of market N at time t, and $e_{i,t}$ is the part of policy return which is affected by other market returns other than $M_{N,t}$. $e_{i,t}$ is assumed to be uncorrelated with each other, and weights are obviously sum to one, that is to say, $\sum_{N=1}^{n} W_{iN,t} = 1$.

The advantage of this method to calculate policy return is that it is more understandable, more explicit and more objective. However, since the data on asset allocations weights of each fund in each period is unavailable, we use an alternative approach to estimate the policy returns-the Asset Class Factor Model.

$$R_{i,t} = \sum_{N=1}^{n} b_{iN} \times F_{N,t} + e_{i,t} \qquad (2)$$

R represents the return on fund i at time t, $F_{N,t}$ represents the value of factor N at time t, b_{iN} represents the sensitivities of policy return of fund i to factor N, and $e_{i,t}$ is the factors which are not taken into consideration as factors in this model. $e_{i,t}$ is assumed to be uncorrelated with each other, and sensitivities are designed to sum to one, that is to say, $\sum_{N=1}^{n} b_{iN} = 1$.

And the factors in this paper are simply the market returns of the major markets each kind of funds invested in, that is, $F_{N,t} = M_{N,t}$.

The sensitivities (b_{iN}) are estimated by time-series regression function as below:

$$R_{i,t} - M_{n,t} = \sum_{N=1}^{n-1} b_{iN} \times (M_{N,t} - M_{n,t}) + e_{i,t} \qquad (3)$$

Where $R_{i,t}$ is the total return of fund i at time t, and others have the same meanings as function (2). In this way, sensitivities are definitely sum to one, because after rearrangement of function (3), and compared it with function (2), we can see that $b_{in} = 1 - \sum_{N=1}^{n-1} b_{iN}$.

With function (2) and function (3), we can estimate the policy return of fund i with function (4) as follows:

$$P_{i,t} = \sum_{N=1}^{n} b_{iN} \times M_{N,t} \qquad (4)$$

2.2.2 Calculation of Weighted Market Return

Market capital weighted market return and equally weighted market return are both used in this paper.

$$M_t = \sum_{N=1}^{n} W_{N,t} \times M_{N,t} \qquad (5)$$

Where M_t the total is weighted market return, $W_{N,t}$ is the weighted of market N which differentiates according to which weight method is used, $M_{N,t}$ is market return of market N. If it is equally weighted return, $W_{N,t}$ equals 1/N; if it is market capital weighted return, $W_{N,t} = C_N / \sum_{N=1}^{n} C_N$.

2.2.3 Total Return Variations Decomposition

In this analysis, we decompose fund total return into policy return and active management return. That is

$$R_{i,t} = P_{i,t} + (R_{i,t} - P_{i,t}) \qquad (6)$$

To determine the contribution of each part to the total fund return variations, we should modify equation (6) as follows:

$$R_{i,t} = b_P(P_{i,t}) + b_S(R_{i,t-}P_{i,t}) + \varepsilon_{i,t} \qquad (7)$$

Where b_P and b_S are obtained by running two other time-series univariate regressions as follows:

$$R_{i,t} = b_P(P_{i,t}) + \varepsilon_{i,t} \qquad (8)$$

$$R_{i,t} = b_S(R_{i,t-}P_{i,t}) + \varepsilon_{i,t} \qquad (9)$$

Alternatively, b_{1P} and b_{1S} are defined as:

$$b_P = \frac{\mathrm{cov}(R_{i,t}, P_{i,t})}{\mathrm{var}(P_{i,t})} \qquad (10)$$

$$b_s = \frac{\mathrm{cov}(R_{i,t}, R_{i,t} - P_{i,t})}{\mathrm{var}(R_{i,t} - P_{i,t})} \qquad (11)$$

With above calculations, contribution of policy return to the total fund return variations can be estimated as

$$R_P = {b_P}^2 \times \frac{\mathrm{var}(P_{i,t})}{\mathrm{var}(R_{i,t})} \qquad (12)$$

Contribution of active management to the total fund return variations can be estimated as

$$R_s = {b_s}^2 \times \frac{\mathrm{var}(R_{i,t} - P_{i,t})}{\mathrm{var}(R_{i,t})} \qquad (13)$$

And because $R_P + R_s + R_e = 1$. (Verification of this equation is elaborated at the end of this section) Contribution of the residual items to the total fund return variations can also be figured out: $R_e = 1 - R_P - R_s$.

2.2.4 Return Variations Decomposition (Total Return vs. Adjusted Return and Market Return)

All steps of the analysis in this section are the same as section 2.2.3 except that the total return is decomposed into three parts: Market return, policy return adjusted after market return and active management return. That is:

$$R_{i,t} = M_t + (P_{i,t-}M_t) + (R_{i,t-}P_{i,t}) \qquad (14)$$

After the same modification, the equation becomes

$$R_{i,t} = b_M M_t + b_P(P_{i,t-}M_t) + b_S(R_{i,t-}P_{i,t}) + \varepsilon_{i,t} \qquad (15)$$

b_P, b_S and b_M are obtained in the same way as those in 2.2.3 by running following

three time-series regression function:

$$R_{i,t} = b_P(P_{i,t} - M_t) + \varepsilon_{i,t} \qquad (16)$$

$$R_{i,t} = b_S(R_{i,t-}P_{i,t}) + \varepsilon_{i,t} \qquad (17)$$

$$R_{i,t} = b_M(M_t) + \varepsilon_{i,t} \qquad (18)$$

Contribution of policy return adjusted after market return, active management return and market return to the total fund return variations can be estimated respectively as

$$R_P = {b_P}^2 \times \frac{var(P_{i,t} - M_t)}{var(R_{i,t})} \qquad (19)$$

$$R_s = {b_s}^2 \times \frac{var(R_{i,t} - P_{i,t})}{var(R_{i,t})} \qquad (20)$$

$$R_M = {b_M}^2 \times \frac{var(M_t)}{var(R_{i,t})} \qquad (21)$$

And because $R_P + R_s + R_e + R_M = 1$, contribution of the residual items to the total fund return variations can also be figured out.

2.2.5 Adjusted Return Variations Decomposition

Different from 2.2.3 and 2.2.4, we decompose total return adjusted after market return into two parts: policy return adjusted after market return and active management return. (Here we do not use active management return adjusted after market return because they are the same)

$$R_{i,t} - M_t = (P_{i,t-}M_t) + (R_{i,t-}P_{i,t}) \qquad (22)$$

After the same modification,

$$R_{i,t} - M_t = b_P(P_{i,t-}M_t) + b_S(R_{i,t-}P_{i,t}) + \varepsilon_{i,t} \qquad (23)$$

b_P, b_S are obtained in the same way as those in 2.2.3 and 2.2.4 by running following three time-series regression function:

$$R_{i,t} - M_t = b_P(P_{i,t} - M_t) + \varepsilon_{i,t} \qquad (24)$$

$$R_{i,t} - M_t = b_S(R_{i,t-}P_{i,t}) + \varepsilon_{i,t} \qquad (25)$$

Contribution of policy return adjusted after market return, active management return to the total fund return adjusted after market return variations can be estimated respectively as

$$R_P = {b_P}^2 \times \frac{\mathrm{var}(P_{i,t} - M_t)}{\mathrm{var}(R_{i,t} - M_t)} \qquad (26)$$

$$R_s = {b_s}^2 \times \frac{\mathrm{var}(R_{i,t} - P_{i,t})}{\mathrm{var}(R_{i,t} - M_t)} \qquad (27)$$

And because $R_P + R_s + R_e = 1$, contribution of the residual items to the total fund return variations can also be figured out.

2.2.6 Return Variations Decomposition (Adjusted Return)

In each funds group, we do month-by month cross-section regression to illustrate the variations of residual items, policy returns and total returns in each month of the total ten-year period. The regression function is:

$$R_{i,t} = a + bP_{i,t} + \varepsilon_{i,t} \qquad (28)$$

This regression is done for each month through all the funds in a group with a total of 120 monthly periods. Here we do not use market adjusted return because during a single month, all the funds in the same group share the same market return, so results will be the same.

Then we calculate standard deviation of $R_{i,t}$ and standard deviation of $\varepsilon_{i,t}$ in each single month, plot them in a chart, and interpret the results.

2.2.7 Verification of Return Variations Decomposition Equation

Here we take equation (15) for example.

$$R_{i,t} = b_M M_t + b_P(P_{i,t-} M_t) + b_S(R_{i,t-} P_{i,t}) + \varepsilon_{i,t} \qquad (15)$$

Where b_M, b_M, and b_S are regression coefficients between total return and three components of total return respectively.

$$b_M = \frac{\mathrm{cov}(R_{i,t}, M_t)}{\mathrm{var}(M_t)} \qquad (29)$$

$$b_P = \frac{\mathrm{cov}(R_{i,t}, P_{i,t} - M_t)}{\mathrm{var}(P_{i,t} - M_t)} \qquad (30)$$

$$b_s = \frac{\mathrm{cov}(R_{i,t}, R_{i,t} - P_{i,t})}{\mathrm{var}(R_{i,t} - P_{i,t})} \qquad (31)$$

Now we take a covariance with $R_{i,t}$ on both sides of equation (15) and obtain

$$\mathrm{cov}(R_{i,t}, R_{i,t}) = b_M \mathrm{cov}(M_t, R_{i,t}) + b_P \mathrm{cov}[(P_{i,t-} M_t), R_{i,t}] + b_S \mathrm{cov}[(R_{i,t-} P_{i,t}), R_{i,t}] + \mathrm{cov}(\varepsilon_{i,t}, R_{i,t}) \qquad (32)$$

Plug equation (29), equation (30) and equation (31) in equation (32), and we can obtain

$$R_M + R_P + R_s + R_e = 1$$

3. Results

Three sets of results are presented in this section: a time-series regression for total returns, a time-series regression for adjusted market returns and a month-by-month cross-sectional regression for total returns.

3.1 Estimation Results: Effectiveness of Policy Return

Using the methodology presented in the previous section, we obtain the following results.

First measure of the goodness of fit of equation (3) is the average R-squares of each of these regression functions, which are listed below.

Table 1

Classification of funds	International funds	Canadian equity funds	Balanced funds
Average R-squares	0.6981	0.9059	0.8796

These high R-squares indicate that the factors we choose can explain very large portion of the variation in returns of these funds. So, as a whole, using these factors as the components of policy return of funds is appropriate.

However, we should still consider whether each single factor has explanatory power against the total return. Thus, another measure we should take into consideration is the individual significance of the factors.

Table 2

Classification of funds	International funds	Canadian equity funds	Balanced funds
Total number of factors minus one	7	3	8
Average number of significant factors	4.7123	2.5342	4.5556
Percentage of significance	67.32%	84.47%	56.95%

From the table above, we can see that more than half of the coefficients are significant. So we can make a conclusion that these regression results are reliable.

With the estimated coefficients and the actual value of factors, we can estimate reliable policy returns to finish the following tests.

Table 3:

Factors	1-3 yr T-bond	3-7 yr T-bond	7-10 yr T-bond	10 yr and above T-bond	TSX60	TSXM	TSX	MSCI Emerging Market
1-3 yr T-bond	1							
3-7 yr T-bond	0.91	1						
7-10 yr T-bond	0.76	0.95	1					
10 yr and above T-bond	0.56	0.80	0.93	1				
TSX60	-0.3	-0.24	-0.16	-0.05	1			
TSXM	-0.24	-0.19	-0.11	0.01	0.80	1		
TSX	-0.3	-0.24	-0.16	-0.04	0.76	0.86	1	
MSCI Emerging Market	-0.31	-0.29	-0.26	-0.18	0.22	0.25	0.31	1

Table 3 shows the correlation between two factors for Canadian balanced funds. Moreover, the average correlations between two factors for Canadian equity funds, Canadian balanced funds and Canadian international funds are 0.75, 0.25 and 0.70. Multicollinearity is under control in our factor model.

3.2 Time-series Regression on Total Returns

3.2.1 Decomposition of Total Returns in Two Components

The total return could be divided into two components: policy return and active management return.

$$R_{i,t} = P_{i,t} + (R_{i,t} - P_{i,t}) \qquad (6)$$

Figure 2 Two Components of Total Returns

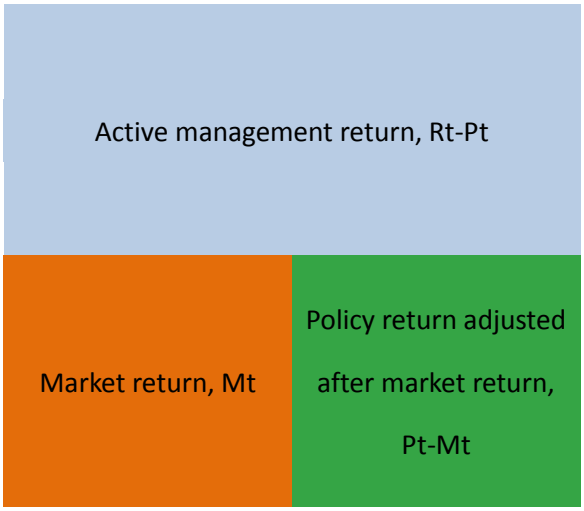


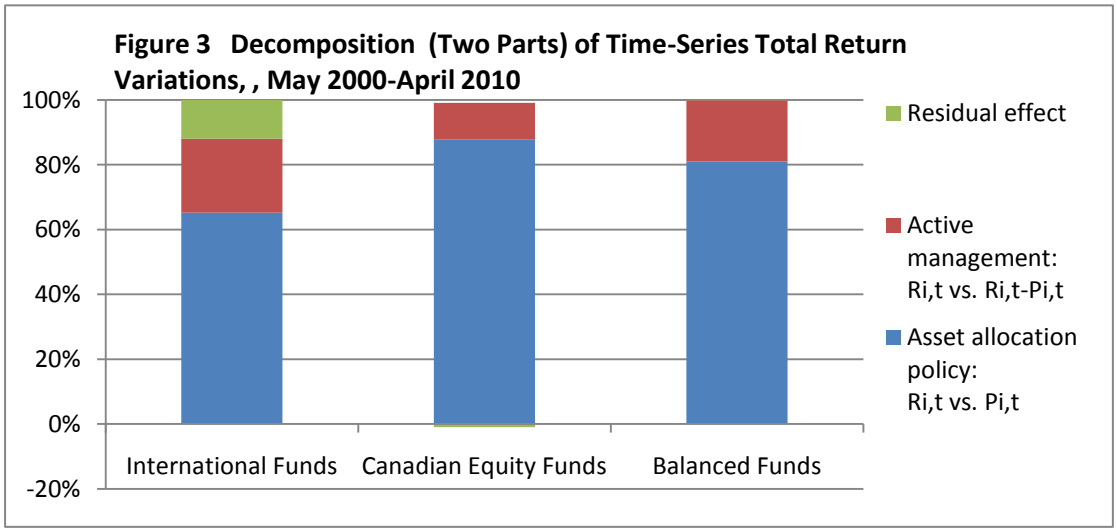
Table 3 summarizes the average time-series R-squares of the two components in equation (6) for all the 3 style funds for the 10-year period. Figure 3 plots the decomposition of total return variations. R-squares show the average contribution of the 2 components to the total return variations for each fund style.

Regardless of market return, asset allocation policy dominates active management, and accounts for most of the total return variations for all the three style funds. It is especially true for Canadian equity funds, for which asset allocation policy explains 89.45% of the total return variation.

For international funds and balanced funds, active management has almost equal level of explanatory power, which is around 20%. For Canadian equity funds, active management only accounts for 11.52% of the total return variation.

The residual effect is a balancing term which makes the two components' R-square add up to 100%. For international funds, residual effect has the highest explanatory power among the three style funds, which is 12.04%. For Canadian equity funds, a negative residual effect comes from negative correlation between the total return and the residual term.

Table 4 Decomposition (Two parts) of Time-Series Total Return Variations in Terms of Average R-squares, May 2000-April 2010			
Average R-squares	International Funds	Canadian Equity Funds	Balanced Funds
Asset allocation policy: $R_{i,t}$ vs. $P_{i,t}$	0.6515	0.8945	0.8098
Active management: $R_{i,t}$ vs. $R_{i,t}$-$P_{i,t}$	0.2281	0.1152	0.1885
Residual effect	0.1204	-0.0097	0.0017
Total	1.0000	1.0000	1.0000



3.2.2 Decomposition of Total Returns in Three Components

We then divide total returns into three components: market return, asset allocation policy return adjusted after market movement and active management return.

$$R_{i,t} = M_t + (P_{i,t} - M_t) + (R_{i,t} - P_{i,t}) \qquad (14)$$

Table 4 summarizes the average time-series R-squares of the three components in equation (14) for all the 3 style funds for the 10-year period. Figure 4 plots the decomposition of total

return variations. R-squares show the average contribution of the three components to the total return variations for each fund style.

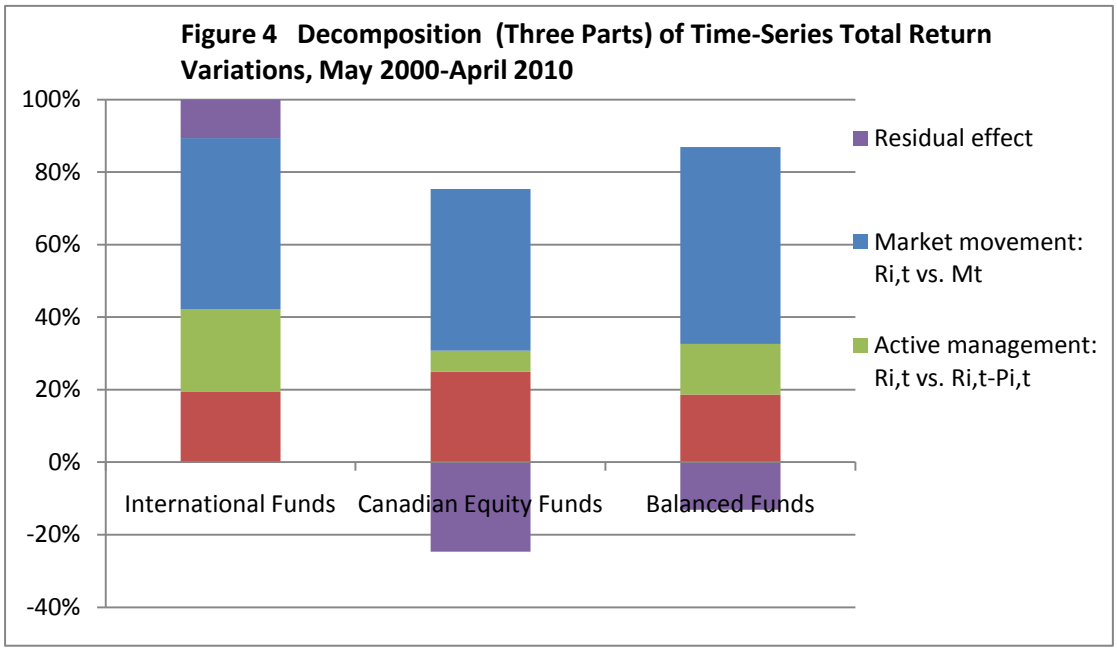
Market movement dominates active management and asset allocation policy return, and accounts for most of the total return variations for all the three style funds. It is especially true for Canadian equity funds and balanced funds, for which market movement explains 88.13% and 73.56% of the total return variations.

For international funds and balanced funds, asset allocation policy and active management have almost equal level of explanatory power, which is around 20%. For Canadian equity funds, asset allocation policy accounts for almost 50% of the total return variation.

Only for international funds, residual effect has the positive explanatory power, which is 10.61%. For both Canadian equity funds and balanced funds, residual effects have negative explanatory power on total returns.

Table 5 Decomposition (Three parts) of Time-Series Total Return Variations in Terms of Average R-squares, May 2000-April 2010

Average R-squares	International Funds	Canadian Equity Funds	Balanced Funds
Market movement: $R_{i,t}$ vs. M_t	0.4720	0.8813	0.7356
Asset allocation policy: $R_{i,t}$ vs. $P_{i,t}$-M_t	0.1938	0.4919	0.2531
Active management: $R_{i,t}$ vs. $R_{i,t}$-$P_{i,t}$	0.2281	0.1152	0.1885
Residual effect	0.1061	-0.4884	-0.1772
Total	1.0000	1.0000	1.0000



3.3 Time-series Regression on Adjusted Market Returns

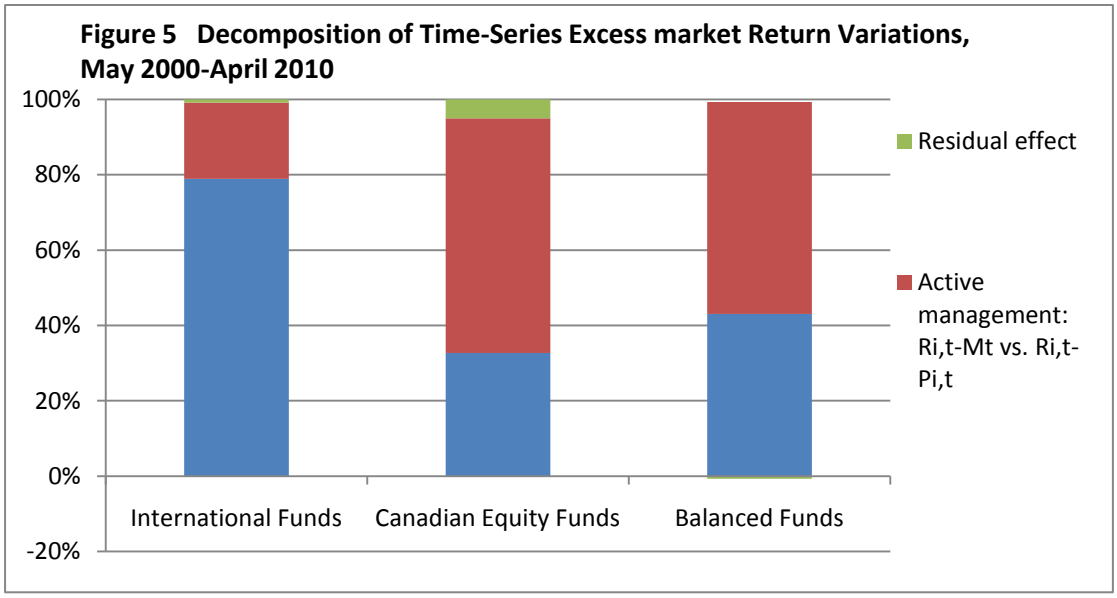
In this section, we remove the overall market movements from total returns and asset allocation policy returns and divide the total returns adjusted after market returns into asset allocation policy returns adjusted after market returns and active management returns.

$$R_{i,t} - M_t = (P_{i,t} - M_t) + (R_{i,t} - P_{i,t}) \qquad (22)$$

Table 5 shows the average time-series R-squares of the two components in equation (14) for all the 3 style funds for the 10-year period. Figure 5 plots the average R-squares of each component.

For Canadian equity funds, asset allocation policy adjusted after market return explains 32.71% of total return adjusted after market return. Active management accounts for 62.22%. For the balanced funds, asset allocation policy adjusted market return and active management explain 43.63% and 57.07% respectively. For international funds, policy adjusted after market return and active management account for 78.92% and 20.21%. For all the three style funds, residual effect has little impact on total return adjusted after market movement.

Table 6 Decomposition of Time-Series Adjusted Market Return Variations in Terms of Average R-squares, May 2000-April 2010			
Average R-squares	International Funds	Canadian Equity Funds	Balanced Funds
Asset allocation policy: $R_{i,t}$-M_t vs. $P_{i,t}$-M_t	0.7892	0.3271	0.4363
Active management: $R_{i,t}$-M_t vs. $R_{i,t}$-$P_{i,t}$	0.2021	0.6222	0.5707
Residual effect	0.0087	0.0507	-0.0070
Total	1.0000	1.0000	1.0000



3.4 Cross-sectional Regression on Total Returns

We run the regression month by month for each fund. The regression equation is:

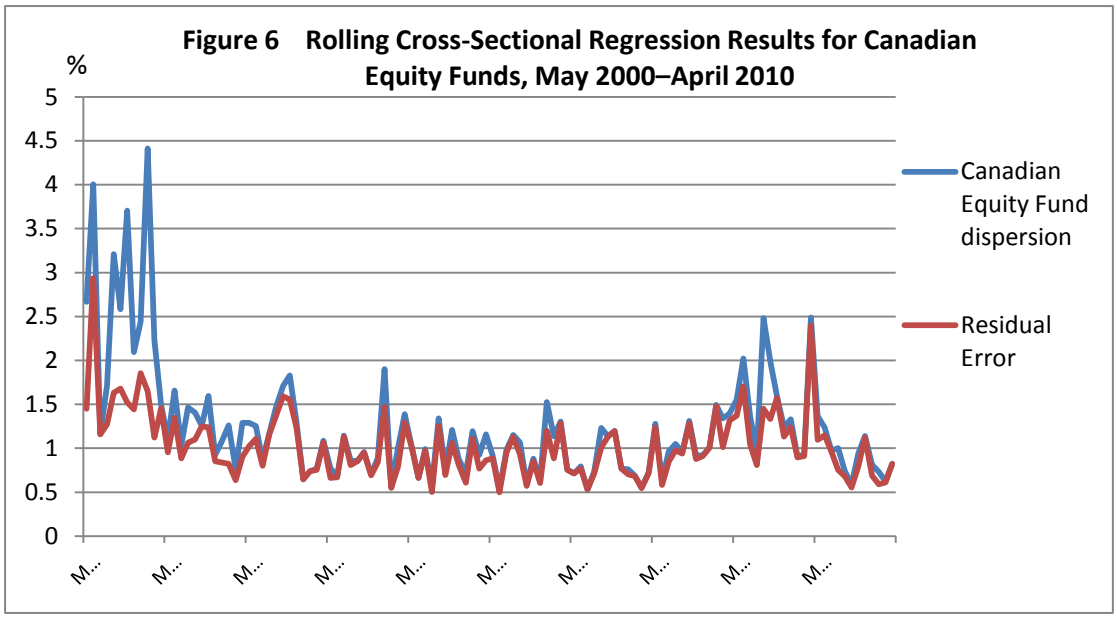
$$R_{i,t} = a + bP_{i,t} + \varepsilon_{i,t}$$

Figure 6 - Figure 8 summarize the results of the 120 cross-sectional analyses for Canadian equity funds from May 2000 to April 2010.

Fund dispersion is the standard deviation of cross-sectional fund total returns $R_{i,t}$. Residual

error is the standard deviation of the regression error $\varepsilon_{i,t}$. **Figure 6 - Figure 8** show that residual errors are relatively stable, which implies that the factor models to estimate the asset allocation policy return is effective.

Figure 6- Figure 8 show that, during the internet bubble from 1999 to 2001, the volatility of the market made the dispersion wider for all the three style funds. During the financial crisis from 2007 to 2009, the dispersion became wider again.



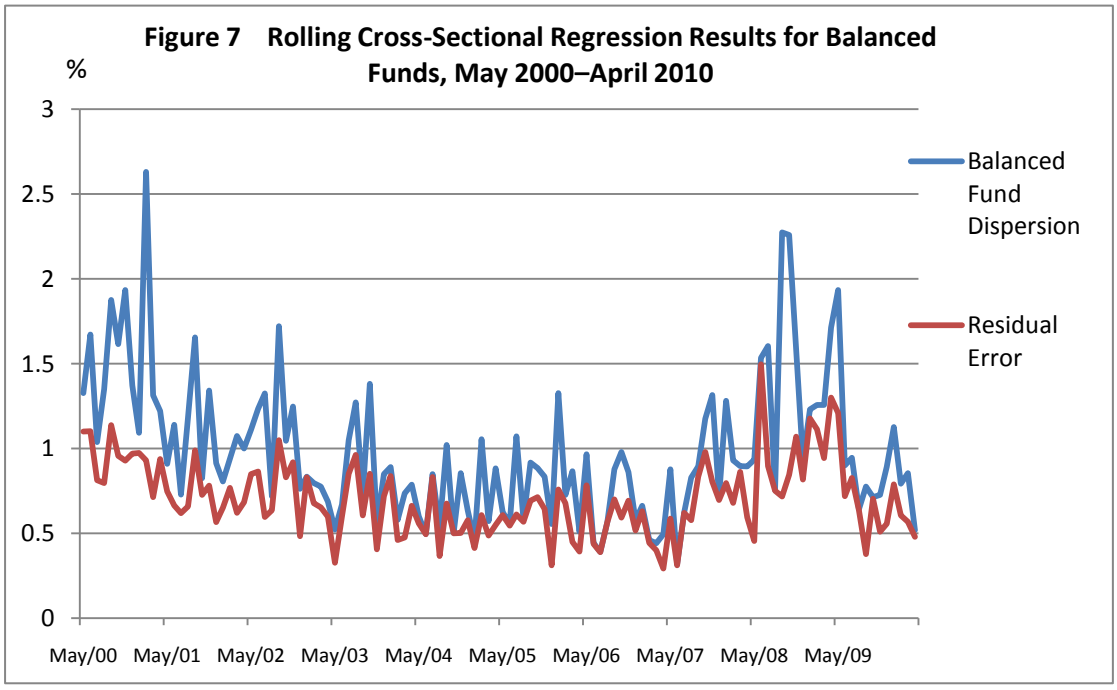
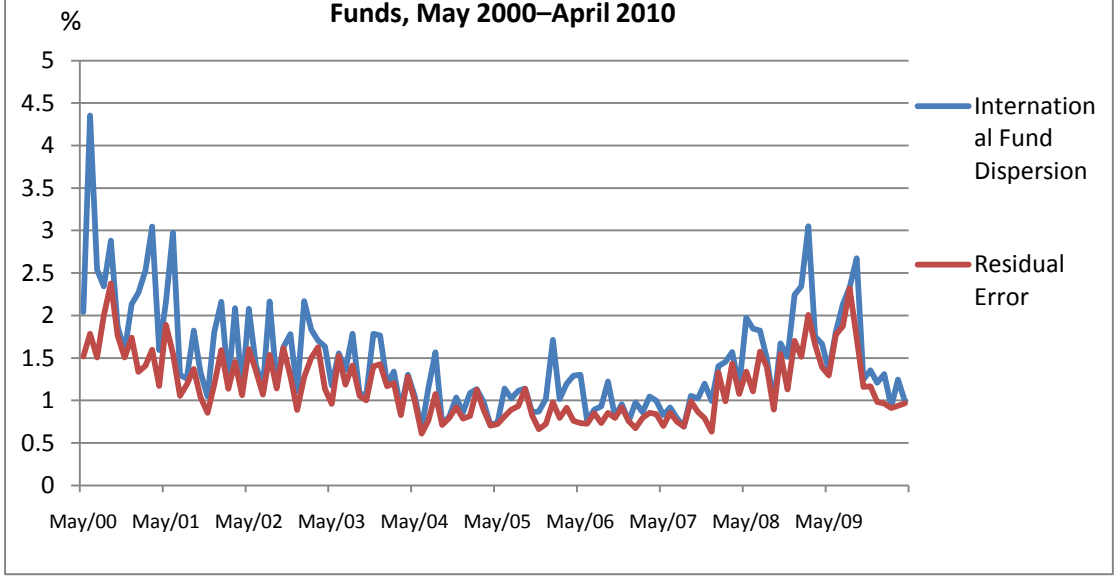


Figure 8 Rolling Cross-Sectional Regression Results for International Funds, May 2000–April 2010



4. Conclusion

The main purpose of our study is to identify and prove the importance of asset allocation in the performance of Canadian funds with different investment styles. As stated in the literature review section, there is evidence that although asset allocation seems to be able to explain more than eighty percent or even ninety percent of the variance of performance, once the volatility of market returns is removed, asset allocation does not have an such an important effect on total returns. We notice that all these opinions are based on data of funds within U.S. In this paper, we are intended to find out whether these arguments make sense in Canada.

4.1 Time-series Regression on Total Returns

4.1.1 Decomposition of Total Returns in Two Components

Firstly, total return (Ri,t) is divided into two parts: policy return (Pi,t) and active portfolio management return (Ri,t-Pi,t). We find that return from asset allocation policy dominates return form active management and residual effect. Although return from asset allocation policy in international funds has lower explanatory power (65.15%) compared to that in Canadian equity funds (89.45%) and balanced funds (80.98%), it is significantly more considerable than active management. This result confirms the most well-known argument that investment policy return can explain very large percent of total return (Brinson, Hood, and Beebower 1986; Brinson, Singer and Beehower 1991).

The lower explanatory power of asset allocation in international funds is not by accident. We suggest three reasons for this result. (1) In Canadian equity and balanced funds, investment focuses on equities and securities traded within Canada. There should be high positive correlations between the returns of these equities and securities. In contrast, in international funds, the returns in different national markets have much smaller correlations. (2) In the calculation of policy return, we use market returns from various security markets, this estimation might make market returns seem to have a greater impact than the actual situation.

(3) We do not exclude the impact of market return from asset allocation policy return, which is also one of the most significant drawbacks of this method. If we view these three factors as a whole, it is not surprising that in Canadian equity funds and balanced funds, asset allocation policy is more important than that in international funds.

4.1.2 Decomposition of Total Returns in Three Components

As some literatures emphasize the dominant market return, we would like to identify the importance of market returns in our case. So in this step total return (Ri,t) is divided into three parts: market return (M_t), policy return adjusted after market return (Pi,t-M_t) and active portfolio management return (Ri,t-Pi,t). Our finding confirms this argument. In international funds, Canadian equity funds and balanced funds, market movements explain 47.2%, 88.13% and 73.56% of the total returns of these three categories of funds respectively. This result is also consistent with our analysis in the section above, that is, market movement is more important when analyzing Canadian equity and balanced funds. The explanation of this phenomenon is the same as the reason for the extremely high explanatory power of total asset allocation policy return in Canadian equity funds and balanced funds.

Asset allocation policy returns adjusted after market returns together with market returns take dominance over active management returns. However, we also notice that once market return is removed from the asset allocation policy return, active management will have an approximately equal level of importance as asset allocation policy. This finding is reasonable, because we can see that the returns of different funds in a certain period differentiated with each other significantly, even though these funds are in a same peer group, which means that they face the same market return. This difference can be explained by different level and quality of active management, as we can see that active management accounts for about twenty percent in each peer group.

Although market movement has been removed from policy returns, this model has another drawback. That is, the RHS of this equation is the total return of the funds, while LHS of this equation consists of asset allocation policy return adjusted after market return. It is not an

appropriate measurement. Here we do not notice the inconsistency of active management return because this return is calculated by subtracting asset allocation policy return from total return. If we consider using adjusted return, both minuend and subtrahend should less the market return. As a result, the modified active management return will not change.

4.1.3 Decomposition of Adjusted Returns in Two Components

We have stated the inconsistency problem of the three-part model. In order to get a more reasonable result, we modify that model by dividing total return adjusted after market return ($R_{i,t}$ - M_t) into asset allocation policy return adjusted after market return ($P_{i,t}$ - M_t) and active management return ($R_{i,t}$ - $P_{i,t}$). Here we also do not consider using active management return adjusted after market return, and the reason has already been stated above.

Since we have already showed the evidence of the dominant position of market movement in determining total return, we now do not consider market return and focus on the adjusted returns. The results are mixed and there could be several interpretations. In international funds, asset allocation policies explain 78.92% of total adjusted return, which is much greater than that of active management (20.21%). However, in decomposition of returns of Canadian equity funds and balanced funds, Active management is the main determinants. If we put the funds in these three peer groups together, for simplification, we take average of these percentages; get an explanatory power of 51.75% for asset allocation policy return adjusted after market return, and 46.50% for active management return. In this simplified situation, asset allocation policy and active management have the same importance. This finding confirms the conclusion made when total return is divided into three parts.

We want to go further to find the reason for the difference between International funds and other two categories of funds, as we have done in the former two sections. We notice that before the subtracting of market return from total return, asset allocation policy plays a relatively less important role in international funds than that in other two kinds of funds. In contrast, after the remove of market impact, asset allocation policy dominates active management in international funds. Firstly, this reversion is mainly caused by market return. In the former section, we can see that in Canadian equity funds and balanced funds, market

movement explains as large as 88.13% and 73.56%, while only 47.20% in international funds. The reason for this result has been stated. That is to say, returns of Canadian equity funds and balanced funds are more closely correlated with relative market performance. This argument can also be verified by review the results of these three time-series regressions. In the first decomposition style, both total return and asset allocation policy return include market return; in the second decomposition style, total return remains the same, while asset allocation policy return is measured exclude from market return; in the third decomposition style, both total return and asset allocation policy are subtracted by market return. Following this logical progress, we can see that in Canadian equity funds and balanced funds, the importance of asset allocation policy is declining. This can be explained simply by the following statement: as market impact is removed gradually, the asset allocation policy return of funds whose policy return is more closely correlated with market return will experience a declining explanatory power. In contrast, in international funds, which are less affected by market returns (because the different national markets are less correlated with each other, so these markets as a whole should have a smaller positive correlation coefficient), asset allocation policy might be more important if market returns are totally removed from total returns and asset allocation policy returns. Secondly, there is an intuitive explanation. International funds are investing in markets in different countries. The trends in these markets are quite different. So the choice of which markets to invest in is extremely important. However, Canadian equity funds focus on Canadian equity markets, in which security prices almost move together, consequently less important asset allocation policy and more important active management. Balanced funds invest in both kinds of markets, so we can see the average R-squares of balanced funds are always between those of international funds and Canadian equity funds.

4.2 Cross-section Analysis

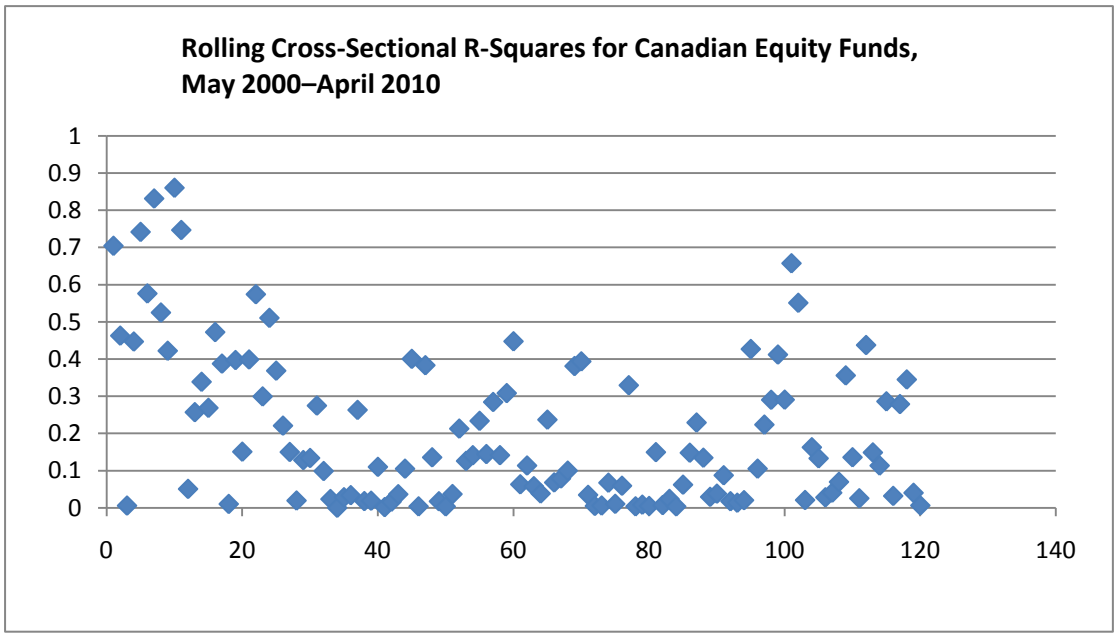
In time-series analysis, we have made conclusion that asset allocation policy has the same level of explanatory power as that of active management, although not all the same to funds of different investment styles. Cross-section analysis has already controlled for market impact,

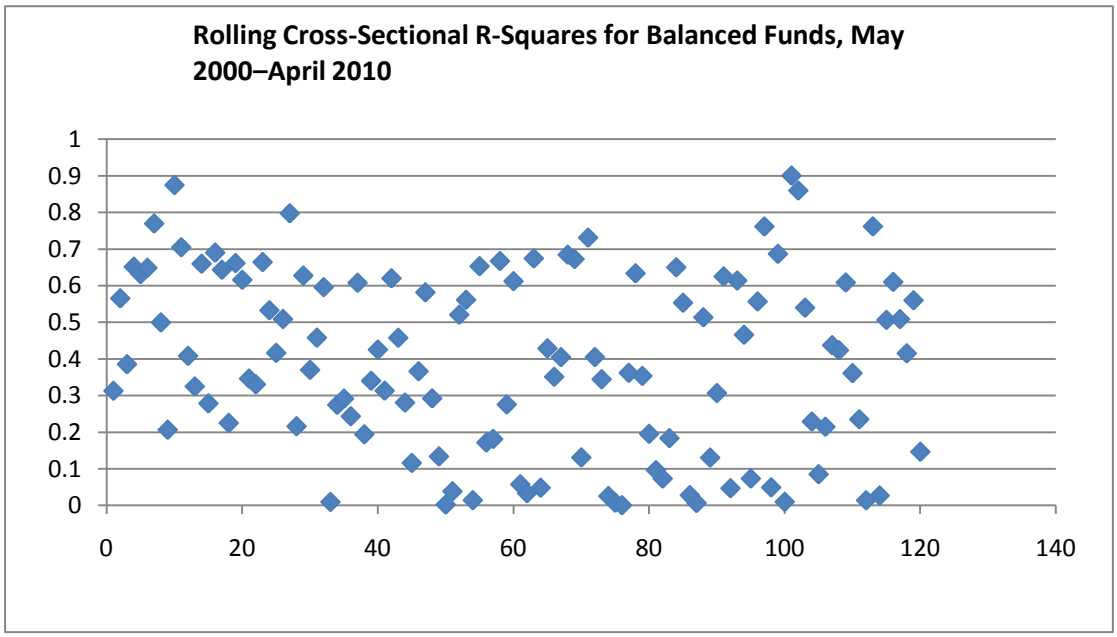
because all the funds within a same peer group face the same market return in a certain period. Generally speaking, month-by-month cross-section analysis gives us similar conclusion.

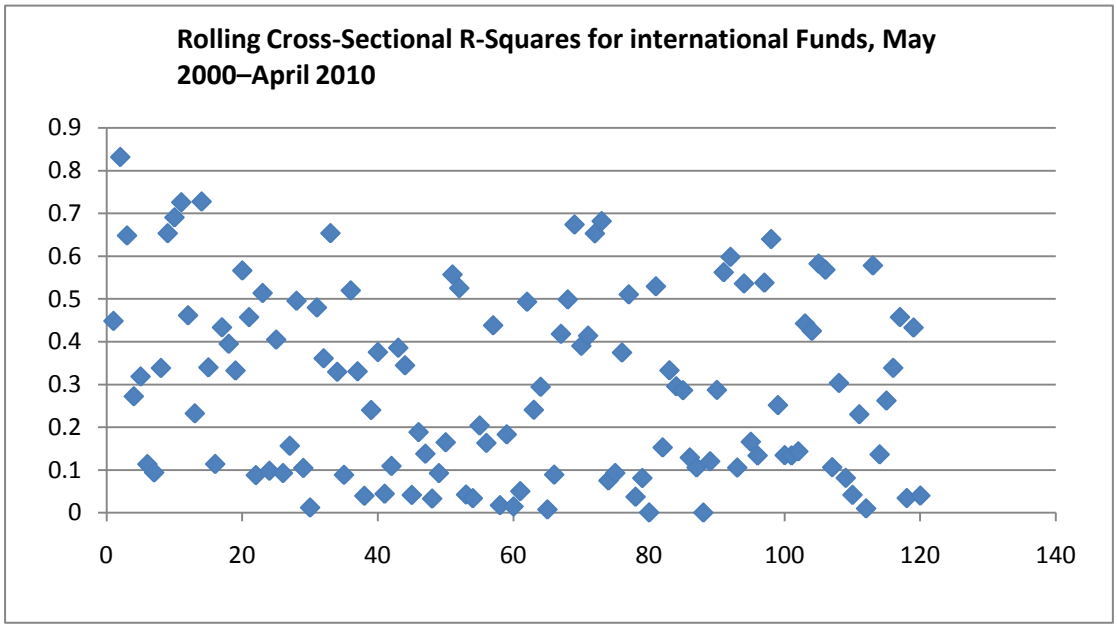
There are some other highlight features when doing cross-section analysis. In Figure 6, 7 and 8, we observed wide dispersion in two periods: from 2000 to 2001 and from 2008 to 2009, which is in accordance with previous studies. The reason for the wide dispersion in the first period is the internet bubble, and the reason for the second period is subprime mortgage crisis. The dispersion between these two periods is lower but still in a high level. These high volatilities tell us the importance of active management, since even in a same fund active management would lead to very different total returns. In our study, we contribute the great volatilities firstly to great dispersions of the returns of these cross-section funds, and secondly to economic events.

Appendices

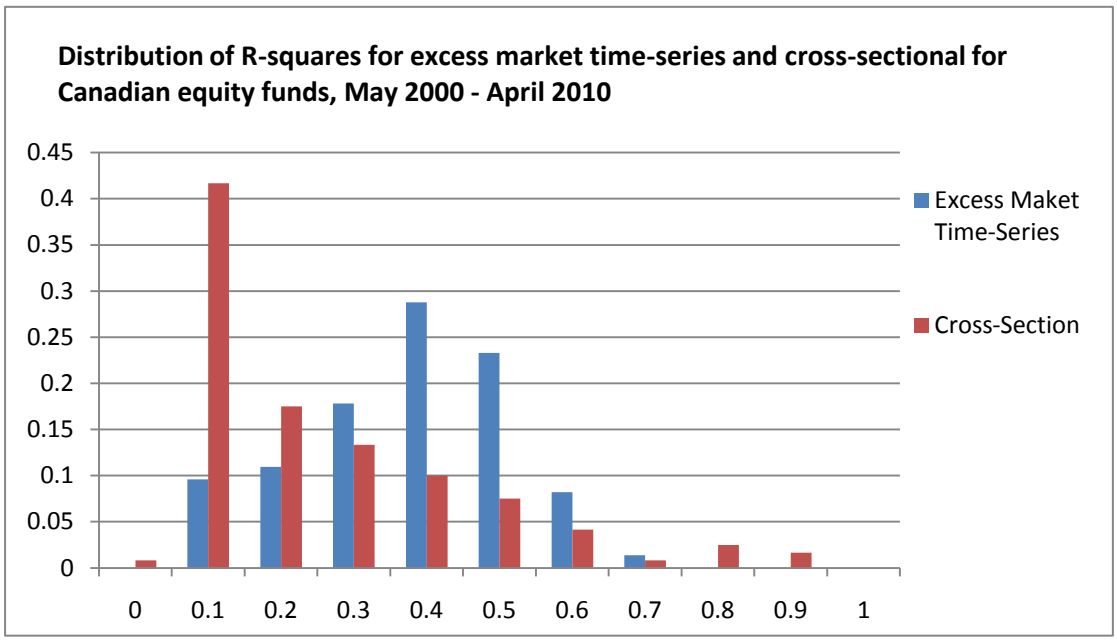
Appendix I: Cross-Sectional R-squares For Three Style Funds

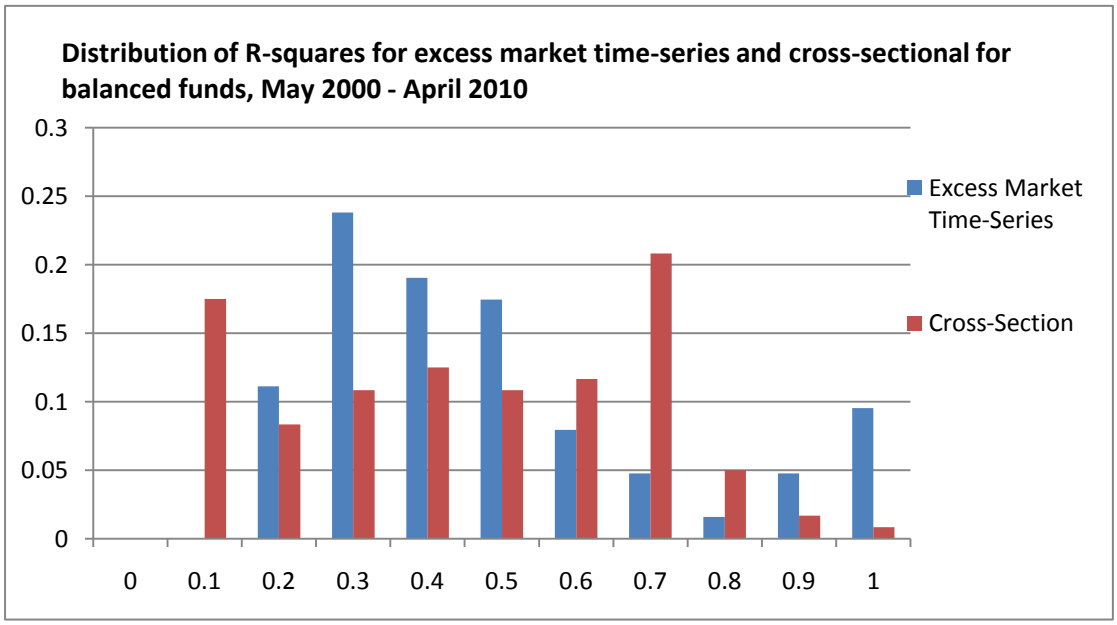


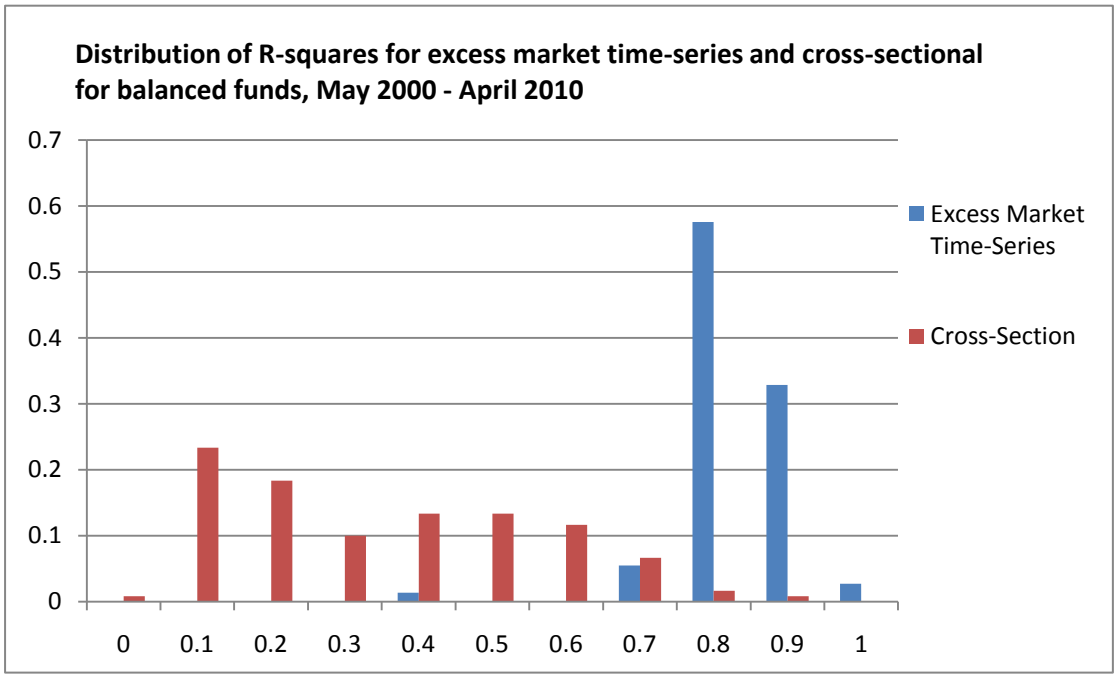



Rolling Cross-Sectional R-Squares for international Funds, May 2000–April 2010
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
20
40
60
80
100
120
140

Appendix II: Distribution of R-squares For Three Style Funds






Distribution of R-squares for excess market time-series and cross-sectional for balanced funds, May 2000 - April 2010
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Excess Market Time-Series
Cross-Section

Appendix III: Return Dispersion and Residual Error Summary

Date	Standard Dispersion of Canadian equity funds (%)	Standard deviation of residual term (%)
May-00	2.6658	1.4499
Jun-00	4.0034	2.9346
Jul-00	1.1609	1.1575
Aug-00	1.7112	1.2726
Sep-00	3.2085	1.6308
Oct-00	2.5816	1.6808
Nov-00	3.7059	1.5216
Dec-00	2.093	1.4427
Jan-01	2.44	1.8549
Feb-01	4.4106	1.6489
Mar-01	2.2305	1.1227
Apr-01	1.4931	1.4547
May-01	1.1086	0.9556
Jun-01	1.6562	1.3469
Jul-01	1.0353	0.8854
Aug-01	1.463	1.0628
Sep-01	1.4065	1.1008
Oct-01	1.2573	1.2508
Nov-01	1.594	1.2377
Dec-01	0.9255	0.8529
Jan-02	1.082	0.8391
Feb-02	1.2584	0.8213
Mar-02	0.7616	0.6376

Apr-02	1.2897	0.9023
May-02	1.2882	1.0237
Jun-02	1.2546	1.1075
Jul-02	0.8678	0.8
Aug-02	1.1681	1.1567
Sep-02	1.4664	1.3691
Oct-02	1.71	1.5914
Nov-02	1.8275	1.5564
Dec-02	1.2964	1.2307
Jan-03	0.6529	0.6452
Feb-03	0.7396	0.7396
Mar-03	0.7646	0.7537
Apr-03	1.0856	1.067
May-03	0.7708	0.6616
Jun-03	0.6754	0.6693
Jul-03	1.1436	1.1327
Aug-03	0.8579	0.8093
Sep-03	0.8531	0.8523
Oct-03	0.9582	0.9504
Nov-03	0.704	0.6911
Dec-03	0.8884	0.8404
Jan-04	1.9007	1.472
Feb-04	0.5515	0.5505
Mar-04	1.0042	0.7887
Apr-04	1.3887	1.2911
May-04	1.0332	1.0241
Jun-04	0.6637	0.6625
Jul-04	0.9902	0.9718
Aug-04	0.5665	0.5026

Sep-04	1.342	1.2546
Oct-04	0.7488	0.6939
Nov-04	1.21	1.0592
Dec-04	0.8749	0.8093
Jan-05	0.7173	0.6067
Feb-05	1.1945	1.1069
Mar-05	0.9248	0.7692
Apr-05	1.1589	0.8614
May-05	0.9139	0.8846
Jun-05	0.528	0.4971
Jul-05	0.9831	0.9542
Aug-05	1.1515	1.1292
Sep-05	1.0682	0.9331
Oct-05	0.5923	0.5718
Nov-05	0.882	0.8466
Dec-05	0.6361	0.6035
Jan-06	1.5248	1.1996
Feb-06	1.1358	0.8845
Mar-06	1.3053	1.2825
Apr-06	0.756	0.7541
May-06	0.7142	0.7121
Jun-06	0.7954	0.7681
Jul-06	0.5327	0.5299
Aug-06	0.7337	0.7117
Sep-06	1.2299	1.0072
Oct-06	1.1358	1.1336
Nov-06	1.1993	1.1942
Dec-06	0.7694	0.7675
Jan-07	0.7626	0.7033

Feb-07	0.6867	0.6842
Mar-07	0.5513	0.5446
Apr-07	0.7198	0.7185
May-07	1.279	1.2386
Jun-07	0.6324	0.5837
Jul-07	0.9662	0.8483
Aug-07	1.0478	0.9748
Sep-07	0.9552	0.9411
Oct-07	1.3114	1.2864
Nov-07	0.9175	0.8765
Dec-07	0.9168	0.9087
Jan-08	1.0102	1.0033
Feb-08	1.4944	1.479
Mar-08	1.339	1.0138
Apr-08	1.3934	1.3181
May-08	1.5524	1.3678
Jun-08	2.0231	1.7044
Jul-08	1.3644	1.0463
Aug-08	0.96	0.8085
Sep-08	2.4792	1.4513
Oct-08	1.9917	1.3347
Nov-08	1.5917	1.575
Dec-08	1.2393	1.1341
Jan-09	1.3302	1.2387
Feb-09	0.9083	0.8955
Mar-09	0.93	0.9109
Apr-09	2.4864	2.3981
May-09	1.367	1.0972
Jun-09	1.2328	1.1461

Jul-09	0.972	0.9595
Aug-09	1.0026	0.7519
Sep-09	0.7382	0.6811
Oct-09	0.5857	0.5515
Nov-09	0.9392	0.7935
Dec-09	1.1402	1.1218
Jan-10	0.8114	0.6891
Feb-10	0.7306	0.5913
Mar-10	0.6227	0.6101
Apr-10	0.8237	0.8211

Date	Standard Dispersion of balanced funds (%)	Standard deviation of residual term (%)
May-00	1.327	1.0999
Jun-00	1.6712	1.1015
Jul-00	1.0383	0.8138
Aug-00	1.3497	0.7965
Sep-00	1.8755	1.1383
Oct-00	1.6143	0.9566
Nov-00	1.9348	0.9282
Dec-00	1.3717	0.9701
Jan-01	1.093	0.9735
Feb-01	2.6294	0.9303
Mar-01	1.3139	0.7137
Apr-01	1.2202	0.9386
May-01	0.9102	0.7478
Jun-01	1.1396	0.6645
Jul-01	0.7284	0.6186

Aug-01	1.1834	0.6586
Sep-01	1.6553	0.9883
Oct-01	0.8255	0.7266
Nov-01	1.3425	0.7808
Dec-01	0.9141	0.5665
Jan-02	0.8069	0.6523
Feb-02	0.9391	0.7683
Mar-02	1.0731	0.6216
Apr-02	1.0005	0.6838
May-02	1.112	0.8493
Jun-02	1.2341	0.8648
Jul-02	1.3248	0.5961
Aug-02	0.7197	0.6372
Sep-02	1.7206	1.0497
Oct-02	1.0457	0.8299
Nov-02	1.2482	0.9188
Dec-02	0.7619	0.4843
Jan-03	0.8338	0.8299
Feb-03	0.797	0.6788
Mar-03	0.7757	0.6528
Apr-03	0.688	0.5984
May-03	0.5239	0.328
Jun-03	0.6698	0.6013
Jul-03	1.0488	0.8518
Aug-03	1.2711	0.9634
Sep-03	0.7313	0.6059
Oct-03	1.3817	0.8515
Nov-03	0.5516	0.4062
Dec-03	0.849	0.72

Jan-04	0.8906	0.8373
Feb-04	0.5796	0.4613
Mar-04	0.7369	0.4765
Apr-04	0.7872	0.6622
May-04	0.5998	0.5583
Jun-04	0.4961	0.4955
Jul-04	0.8496	0.833
Aug-04	0.5303	0.3671
Sep-04	1.0202	0.6756
Oct-04	0.5036	0.5
Nov-04	0.8543	0.5031
Dec-04	0.6353	0.5782
Jan-05	0.4567	0.4131
Feb-05	1.055	0.6085
Mar-05	0.5727	0.4874
Apr-05	0.8832	0.5499
May-05	0.6271	0.6088
Jun-05	0.5556	0.5462
Jul-05	1.0722	0.6117
Aug-05	0.5822	0.5679
Sep-05	0.9181	0.6938
Oct-05	0.8849	0.7128
Nov-05	0.8338	0.6432
Dec-05	0.5561	0.3123
Jan-06	1.326	0.7586
Feb-06	0.7277	0.6783
Mar-06	0.8667	0.4492
Apr-06	0.5109	0.394
May-06	0.9667	0.7827

Jun-06	0.444	0.4382
Jul-06	0.3917	0.3902
Aug-06	0.5669	0.5667
Sep-06	0.8781	0.7013
Oct-06	0.9788	0.5923
Nov-06	0.8612	0.6923
Dec-06	0.5775	0.518
Jan-07	0.6637	0.6309
Feb-07	0.4618	0.4446
Mar-07	0.4428	0.4001
Apr-07	0.4954	0.293
May-07	0.8787	0.5872
Jun-07	0.3168	0.3123
Jul-07	0.6226	0.6205
Aug-07	0.8285	0.5777
Sep-07	0.894	0.8336
Oct-07	1.1765	0.9794
Nov-07	1.3145	0.8047
Dec-07	0.7133	0.6964
Jan-08	1.2822	0.7966
Feb-08	0.9298	0.6795
Mar-08	0.8963	0.8627
Apr-08	0.8946	0.5955
May-08	0.9335	0.4557
Jun-08	1.5348	1.4964
Jul-08	1.6041	0.8976
Aug-08	0.7554	0.7516
Sep-08	2.2743	0.7171
Oct-08	2.259	0.8457

Nov-08	1.5793	1.0711
Dec-08	0.932	0.8183
Jan-09	1.2311	1.1775
Feb-09	1.2577	1.1143
Mar-09	1.2576	0.9431
Apr-09	1.7138	1.301
May-09	1.9335	1.2096
Jun-09	0.901	0.7201
Jul-09	0.9462	0.8274
Aug-09	0.6417	0.6372
Sep-09	0.7762	0.3787
Oct-09	0.7135	0.7038
Nov-09	0.7261	0.5101
Dec-09	0.893	0.5575
Jan-10	1.1262	0.7893
Feb-10	0.792	0.6056
Mar-10	0.856	0.5677
Apr-10	0.5203	0.4807

Date	Standard Dispersion of international funds (%)	Standard deviation of residual term (%)
May-00	2.0422	1.5168
Jun-00	4.3534	1.7841
Jul-00	2.5375	1.5048
Aug-00	2.3438	1.9996
Sep-00	2.8797	2.3774
Oct-00	1.8757	1.7662
Nov-00	1.5823	1.5063
Dec-00	2.1368	1.7383

Jan-01	2.2685	1.3351
Feb-01	2.5284	1.4062
Mar-01	3.0479	1.5953
Apr-01	1.5936	1.1694
May-01	2.1565	1.8898
Jun-01	2.974	1.5518
Jul-01	1.2974	1.0543
Aug-01	1.2576	1.1839
Sep-01	1.8226	1.3719
Oct-01	1.3339	1.0376
Nov-01	1.0471	0.8556
Dec-01	1.8026	1.187
Jan-02	2.1624	1.5931
Feb-02	1.1899	1.1366
Mar-02	2.0854	1.4543
Apr-02	1.1189	1.0629
May-02	2.0803	1.6051
Jun-02	1.4166	1.3496
Jul-02	1.1624	1.0678
Aug-02	2.1641	1.5371
Sep-02	1.2041	1.1396
Oct-02	1.6263	1.6167
Nov-02	1.7815	1.2849
Dec-02	1.1099	0.8873
Jan-03	2.1696	1.2765
Feb-03	1.8332	1.5013
Mar-03	1.7047	1.6277
Apr-03	1.6339	1.1322
May-03	1.1723	0.9593

Jun-03	1.5554	1.5246
Jul-03	1.3587	1.1846
Aug-03	1.7849	1.4105
Sep-03	1.0782	1.0543
Oct-03	1.0597	1.0003
Nov-03	1.7864	1.4002
Dec-03	1.7641	1.4282
Jan-04	1.1918	1.167
Feb-04	1.3384	1.2058
Mar-04	0.89	0.8264
Apr-04	1.3022	1.2808
May-04	1.052	1.0023
Jun-04	0.6655	0.6083
Jul-04	1.1495	0.7651
Aug-04	1.5645	1.078
Sep-04	0.7267	0.7113
Oct-04	0.8084	0.7947
Nov-04	1.0339	0.9226
Dec-04	0.8574	0.7845
Jan-05	1.0875	0.8151
Feb-05	1.1335	1.1237
Mar-05	0.9766	0.8828
Apr-05	0.7065	0.7014
May-05	0.7395	0.7207
Jun-05	1.1389	0.8107
Jul-05	1.022	0.8907
Aug-05	1.1127	0.9347
Sep-05	1.1409	1.1367
Oct-05	0.862	0.8229

Nov-05	0.8692	0.6631
Dec-05	1.0194	0.7218
Jan-06	1.7112	0.9771
Feb-06	1.0175	0.7946
Mar-06	1.1957	0.9154
Apr-06	1.2914	0.7605
May-06	1.3031	0.7348
Jun-06	0.7556	0.7267
Jul-06	0.8919	0.8496
Aug-06	0.9279	0.7338
Sep-06	1.2224	0.8552
Oct-06	0.8073	0.7922
Nov-06	0.9568	0.9173
Dec-06	0.7542	0.7541
Jan-07	0.9799	0.6722
Feb-07	0.8629	0.7944
Mar-07	1.046	0.8544
Apr-07	0.9972	0.837
May-07	0.8264	0.6982
Jun-07	0.9163	0.8552
Jul-07	0.7906	0.7477
Aug-07	0.6912	0.6912
Sep-07	1.0535	0.9883
Oct-07	1.0228	0.8637
Nov-07	1.1965	0.7916
Dec-07	0.9937	0.6297
Jan-08	1.4029	1.3271
Feb-08	1.4516	0.9888
Mar-08	1.568	1.4323

Apr-08	1.1561	1.0762
May-08	1.972	1.3405
Jun-08	1.8434	1.1062
Jul-08	1.8207	1.5753
Aug-08	1.499	1.3947
Sep-08	0.9564	0.8903
Oct-08	1.6708	1.5466
Nov-08	1.5133	1.1299
Dec-08	2.2445	1.7019
Jan-09	2.3419	1.5133
Feb-09	3.0524	2.0058
Mar-09	1.7535	1.6579
Apr-09	1.664	1.389
May-09	1.3492	1.2933
Jun-09	1.8118	1.7739
Jul-09	2.1363	1.8746
Aug-09	2.3309	2.3196
Sep-09	2.6737	1.7364
Oct-09	1.2463	1.1584
Nov-09	1.3559	1.1648
Dec-09	1.2065	0.9812
Jan-10	1.3089	0.9641
Feb-10	0.9245	0.9087
Mar-10	1.2443	0.9371
Apr-10	0.9872	0.9674

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